

Claims:

2. An apparatus for measuring the transmission or attenuation of electromagnetic radiation through an object, said apparatus including an electromagnetic radiation emitter and detector,  
  
characterised in that the apparatus further includes a drive apparatus capable of reversibly placing the said emitter immediately adjacent or in contact with a surface of the object such that any emitted electromagnetic radiation from the emitter is transmitted into the object, wherein to perform transmission/attenuation measurements, said emitter is positioned by said drive apparatus immediately adjacent or in contact with the surface of said object and said detector is positioned on an opposing side of the object such that the detector receives electromagnetic radiation transmitted through the object from the emitter.
3. The apparatus as claimed in claim 1, wherein said apparatus is configurable to perform temperature measurements by positioning of the emitter immediately adjacent or in contact with the surface of said object and positioning said detector on an opposing side of the object such that the detector receives any electromagnetic radiation transmitted through the object from the emitter.
4. The apparatus as claimed in claim 1 or claim 2, wherein said object includes any substance, material, or organic matter containing moisture and/or any other substance where the transmittivity of electromagnetic radiation energy changes measurably with temperature.
5. The apparatus as claimed in any one of the preceding claims, wherein said object is frozen, near frozen or chilled.

6. The apparatus as claimed in any one of claims 1 - 4, wherein said drive apparatus is capable of reversibly placing the said microwave detector on an opposing side of said object to said emitter.
7. The apparatus as claimed in any one of claims 1 - 5, wherein said drive apparatus is a pneumatic, hydraulic, or electro-mechanical operated linear actuator.
8. An apparatus for measuring the transmission or attenuation of electromagnetic radiation through an object, said apparatus including an electromagnetic radiation emitter and detector, characterised in that the apparatus further includes a drive apparatus capable of reversibly placing the said emitter immediately adjacent or in contact with a surface of the object such that any emitted electromagnetic radiation from the emitter is transmitted into the object, and a proximity sensor capable of determining the proximity of the object to the emitter, wherein to perform transmission/attenuation measurements, said emitter is positioned by said drive apparatus immediately adjacent or in contact with the surface of said object and said detector is positioned on an opposing side of the object such that the detector receives electromagnetic radiation transmitted through the object from the emitter.
9. The apparatus as claimed in claim 7, wherein the proximity sensor is an ultrasonic sensor.
10. The apparatus as claimed in any one of the preceding claims, wherein said detector is positionable immediately adjacent to, or in contact with, said object.
11. The apparatus as claimed in any one of claims 1-8, wherein said detector is located proximate to, but not in contact with said object.
12. The apparatus as claimed in any one of the preceding claims, further including

a moving conveyance configured to transport a plurality of objects along a primary axis of travel passing between the emitter and detector.

13. The apparatus as claimed in claim 11, wherein the moving conveyance includes conveyor systems, pallet-handling systems, automated cargo transport systems, robotic, manual or human-operated object handling and/or transportation systems.

14. A method of measuring the transmission or attenuation of electromagnetic radiation through successive objects using the apparatus claimed in claim 11 or 12, comprising the steps;

- successively transporting objects via said conveyance system between the emitter and detector along the primary axis of travel;
- positioning the emitter adjacent to, or in contact with, each object when interposed between said emitter and detector;
- performing an electromagnetic radiation transmission or attenuation measurement;
- moving the emitter away from the object.

15. The method as claimed in claim 13 including the further steps of;

- positioning the detector adjacent to, or in contact with, each object when interposed between said emitter and detector prior to performing the electromagnetic radiation transmission or attenuation measurement;
- moving the detector away from the object.

16. The method as claimed in claims 13 or 14, wherein the apparatus is located and operable external to any enclosure or housing.

17. A method of measuring temperature of an object using microwave radiation using the apparatus as claimed in claims 1-12, said method characterised by the steps of:

- using said drive apparatus to position the microwave emitter immediately adjacent or in contact with a surface of said object;
- irradiating the object with microwave radiation from the emitter;
- detecting microwave radiation transmitted through the object with the microwave detector positioned on an opposing side of the object to said emitter
- calculating the object temperature from said microwave radiation received by the detector.

18. An apparatus substantially as hereinbefore described with reference to, and as shown in the drawings.

19. A method substantially as hereinbefore described with reference to, and as shown in the drawings.